

ABSTRACT

A method is provided for etching a dielectric structure. The dielectric structure comprises: (a) a layer of undoped silicon oxide or F-doped silicon oxide; and (b) a layer of C,H-doped silicon oxide. The dielectric structure is etched in a plasma-etching step, which plasma-etching step is conducted using a plasma source gas that comprises nitrogen atoms and fluorine atoms. As one example, the plasma source gas can comprise a gaseous species that comprises one or more nitrogen atoms and one or more fluorine atoms (e.g., NF₃). As another example, the plasma source gas can comprise (a) a gaseous species that comprises one or more nitrogen atoms (e.g., N₂) and (b) a gaseous species that comprises one or more fluorine atoms (e.g., a fluorocarbon gas such as CF₄). In this etching step, the layer of C,H-doped silicon oxide is preferentially etched relative to the layer of undoped silicon oxide or F-doped silicon oxide. The method of the present invention is applicable, for example, to dual damascene structures.